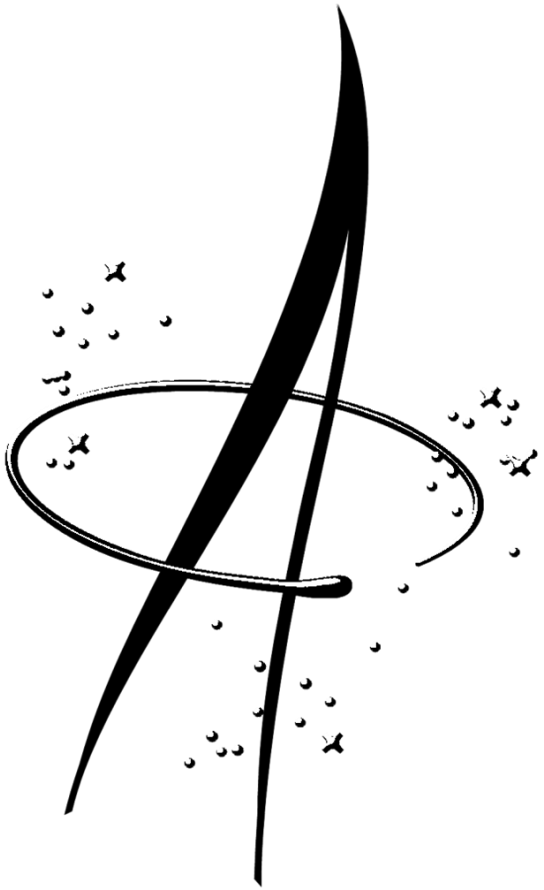
National Aeronautics and Space Administration

NASA ACADEMY AT MARSHALL SPACE FLIGHT CENTER



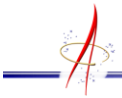
PROFILE BOOK 2011

"This is NASA's vision for the future. Our mandate is:

- To improve life here,
- To extend life to there,
- To find life beyond

So, how do we get to that impressive picture of the future? Part of the answer is by executing NASA's mission:

- ***To understand and protect our home planet***
- ***To explore the Universe and search for life***
- ***To inspire the next generation of explorers***
  … as only NASA can."



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Program Description

The NASA Academy is an intensive resident summer program of higher learning for college undergraduate and graduate students interested in pursuing professional and leadership careers in space-related fields.

The NASA Academy program is designed to present a comprehensive package of information and experiences about the organization of the NASA agency, some of its most important current and planned science, engineering, education, and technology enterprises, as well as a number of non-technical areas of critical significance, such as management, budgeting, safety, personnel and career development, leadership, space law, international cooperation, etc. Besides attending lectures and workshops, students are involved in supervised research in MSFC laboratories, and participate in visits to other NASA Centers and facilities and a number of space-related academic laboratories and industries.

Eligibility, Selection Criteria, and Placement

The participants in the Marshall NASA Academy have been selected based following criteria:

- academic rank (junior, senior, first, or second year graduate)
- academic performance (GPA higher than 3.0 or equivalent)
- demonstrated interest in the space program
- demonstrated leadership qualities
- research and/or project interest and experience
- maturity
- recommendation and references
- citizenship or permanent residence is required for US applicants

Both the selection process and placement of the Academy participants in Marshall's research groups were assisted by recommendations from faculty, administrators, academic supervisors, and co-workers, and the applicants' self-profiling essays.

A Brief History of the NASA Academy

The NASA Academy was founded in 1993 (as the "NASA Space Academy") at the Goddard Space Flight Center by Gerald (Jerry) Soffen, former Mars Viking project scientist, architect of the NASA Astrobiology program, and first Director of the Goddard Office of University Programs. Jerry was an accomplished scientist and a dedicated educator. He took advantage of the unusual opportunities presented to him during his career and realized the importance of mentoring in the life of young professionals. In his vision, the Academy was intended to exceed in purpose and content all the other regular internships by familiarizing its participants with as many facets of the NASA agency as possible. With his dynamic personality and unique leadership, he opened many gateways and defined a new standard of excellence.

As the reputation of the Goddard Academy widened, new NASA Academy Programs were started at the Marshall Space Flight Center (1994), the Ames Research Center (1997), and the Dryden Flight Research Center (1997). In 2005 Goddard, Glenn, and Marshall will host their own Academy.

The name of the program changed from "NASA Space Academy" to "NASA Academy" at specific NASA Centers. A continuous effort is being made to establish or re-establish Academies at various NASA Centers, with different profiles and focus areas.

Jerry Soffen died on November 22, 2000. We honor his legacy by continuing the Academy program that he loved so well.

In 2011, the NASA Academy celebrated nineteen years of successful activity. So far, more than 700 students have graduated from the program, both domestic and international students.

Wayne State University
Detroit, Michigan
Chemical Engineering with minor in Chemistry
Bachelors of Science, May 2013
E-mail: elizabeth.barrios.2013@gmail.com

NASA Academy Research Project:

"Design and Breadboard for a Laboratory System for the Extraction of Space Resources by Electrolysis in Ionic Electrolytes"
Principal Investigator: Peter Curreri

Research and Experience

- **NASA USRP Intern,** Kennedy Space Center, FL *(Jan.2011-May 2011)*
  - Investigated the potential antimicrobial potency of different materials for use in a water treatment system by using the CDC High Shear Bio Reactor
  - Developed skills in performing various microbiology techniques
  - Assisted in making and analyzing hydrogen sensing tape used for deployment during the STS-133 shuttle launch on February 24, 2011
  - Learned about the history of hydrogen tape development at KSC and why the material for STS-133 deployment was chosen to be tested
  - Gained a working understanding of In-Situ Resource Utilization (ISRU) and Molten Regolith
  - Developed my professional business skills (e.g. presenting myself and communicating as a professional, working as part of a team, presenting my research in a professional manner)
- **Student for Temporary Employment,** US Army TARDEC, Warren, MI *(May 2009-Jan.2011)*
  - Developed a test method and conducted corresponding lab tasks to standardize an automatic titration method with ASTM
  - Assisted in developing a test for evaluating the overall effectiveness of certain seat cushions to enhance soldiers field of vision in military vehicles
  - Assisted in research on vehicle seats, restraint systems, and black boxes for military vehicle usability
- **Lab Assistant,** Next Energy – National Biofuels Energy Lab, Detroit, MI *(Sep.2009-Feb.2010)*
  - Assisted Dr. Simon Ng in his research efforts by conducting experiments on algae growth rates and their oil production rates
  - Prepared and presented a data summary of my current work

Memberships and Activities

- Tau Beta Pi – Engineering Honors Society, April 2010 - Present
  - Corresponding Secretary – April 2010 – December 2010
- Alpha Gamma Delta, The International Women's Fraternity: Initiated in April 2009
  - Vice President Finance – December 2009-December 2010
  - Activities Coordinator – April 2009-December 2009
- American Institute of Chemical Engineers: May 2009-December 2010
  - Computer Chair - May 2010-Decemember 2010
- I also participate in a wide variety of community service activities hosted through my school, my church, and the organizations to which I belong.

Honors and Awards

- College of Engineering Dean's List (2009-2010, 2010-2011)
- Chemistry Chair's Honor's List (2010)
- Tau Beta Pi – The Engineering Honors Society (initiated April 2010)
- Scholarship Recipient (Kehrl Endowed Scholarship, Engineering Minority Scholarship, McMicking Annual Scholarship, Carr Scholarship)

Skills

Microsoft 2010 Office Suite; some knowledge using MATLAB; some knowledge using AutoCAD; some fluency in Spanish

Hobbies and Interests

I love staying active and fit by working out, running, dancing, snowboarding, etc. I especially love dancing, although, the college life doesn't really allow the time nor money for me to take classes. I also love to run and want to one day run either a half marathon or a marathon in every state before I die. I feel like that would be such an accomplishment. I also love shopping, going to the beach, and hanging with my friends in general.

Personal Statement

Ever since I was ten years old, I have known that I want to work for NASA. If I don't end up working for NASA, or at least in the space industry, I don't think I would ever absolutely LOVE my job. Nothing compares to the excitement, the passion, or anything that I get from NASA and space-related talk. After completing my first NASA internship and seeing my first two shuttle launches this past Spring, I can 100% say, this is where I want to be.

After being exposed to the Materials Science division at KSC, I am pretty sure that I want to pursue an advanced degree in the Materials Science aspect of Chemical Engineering. As of now, I think I would want to concentrate on either composite or polymer materials. I am hoping that my work this coming semester will further allow me to find where my research interests are.

Alabama A&M University
Huntsville, Alabama
Mechanical Engineering with Propulsion focus
Bachelors of Science, May 2012
E-mail: jmbell303@gmail.com

NASA Academy Research Project:

"Aging parameters on Cold-formed Aluminum-Lithium 2090 Stringers" and "Launch abort system attitude control motor valve pintle guide gasket"
Principal Investigator: Tina Malone

Research and Experience

- **Model Airplane Project,** Alabama A&M University (Spring 2009)
  - Group of 4 students assigned to build an airplane glider that could fly independently using balsa wood, designed using computer software simulation
  - Designed model using Autodesk Inventor
  - Distance of flight exceeded gliders in all classes, reaching 150ft in distance. Received A on project and glider was placed on display in the Engineering building. Recognized for my leadership role on the project by professor and peers
- **Concrete Masonry,** *Laborer,* Atlanta, Georgia (Summer 2008)
  - Mixed mud for brick layers and insured working area was kept clean and free of debris while following all OSHA safety requirements.
  - Summer employment provided partial tuition funding for fall 2008 semester

Honors and Activities

- Achieved Academic Honors Award (>3.0 GPA) 4 semesters
- Active member of the National Society of Black Engineers

Skills

- Solid understanding of computer programming using FORTRAN, Solid Edge Packages, Interactive Heat Transfer 2.0, and MATLAB
- Laboratory experience with Subsonic Wind Tunnel, Linear Heat Conductor and MTS 810 Material Test System, Torsion Machine, Vickers Hardness Test Machine
- Extensive use of Microsoft Word, Power Point, and Excel
- Strong communication skills
- Works effectively independently and with a team

Hobbies and Interests

I enjoy playing sports such as basketball, baseball, and football. I also enjoy swimming and lots of outdoor activities. I read as much as I can, authors vary. I enjoy my studies, learning new things, and meeting new and different people.

Personal Statement

I am a senior at Alabama A&M University pursing a degree in Mechanical Engineering. Engineering has become not just a study of mine, but a journey in search of knowledge. During my first year in college I originally started studying business. Then with my love of math and solving complicated problems, I quickly gravitated towards engineering with some research and advising.

I have a hands-on mentality and approach to life which carried over to my studies. I actively reach out to members of my community and high school students to promote and encourage studies in the STEM field. This has given me the opportunity to communicate with others that are as passionate as I am about engineering hoping to make a difference. I'm deep into my studies and researching related material, exposing myself to many different means of learning -- I feel like I can never learn enough. I hope to continue to grow and exceed expectations by utilizing my skills in the near future to be on the cutting edge of technology.

Princeton University
Princeton, New Jersey
Mechanical and Aerospace Engineering
Bachelors of Science, June 2012
E-mail: pdavison@princeton.edu

NASA Academy Research Project:

"Rocket City Space Pioneers in pursuit of the Google Lunar X-prize" with Dynetics
Principal Investigator: Marty Kress

Research and Experience

- **Junior Independent Work -** *Princeton University (2011)*
  "Spacecraft Attitude Determination via Recursive Direction Cosine Matrix Estimation"
  - Researched, developed and simulated a novel recursive attitude estimation technique that uses a constrained optimization algorithm to explicitly estimate DCM elements
- **Mechanical and Aerospace Engineering Research Assistant**
  High Contrast Imaging Laboratory, Princeton University (2010)
  - Worked as part of Princeton's team investigating direct imaging of extrasolar planets for the NASA Terrestrial Planet Finder (TPF) mission using a coronagraph and MEMS deformable mirrors for wavefront control
  - Developed a new model for the deformable mirror input voltage to surface deformation relationship based on newly available empirical data

  Structures and Mechanics Laboratory, Princeton University (2009)
  - Aided in testing and designing new equipment and experiments for Introduction to Engineering class.
- **Microsatellite Team Design Project –** *Princeton University (2010)*
  - As part of a space systems design course developed a concept microsat design for a Technology Demonstration Mission for coronagraph and deformable mirror hardware.
  - Member of the mission analysis team: defined subsystem requirements and performed trade studies to determine favorable mission architecture
  - Leader of Attitude Determination and Control team: performed trade studies to select hardware, designed subsystem operation modes' control laws and simulated system dynamics in MATLAB
  - Project design presented to *Team X* engineers at NASA JPL
- **Princeton-Boeing Intern**
  High Contrast Imaging Laboratory, Princeton University (2009)
  - Worked with the Princeton TPF team

- Incorporated known residual shape of the deformable mirrors into the wavefront algorithm, achieving factor of 2 contrast improvement
- Designed and built a prototype optical system to simulate the contrast difference between incoherent star and planet light using a single source

Memberships and Activities

Princeton Men's Club Rugby, Princeton University
President, Fall 2010 – Present; *Treasurer,* Fall 2009-Fall 2010
Eagle Scout: Boy Scouts of America March, 2005 – Present
Eagle Scout Project: designed/constructed batting cage for youth baseball league.

Honors and Awards

- AIAA Foundation Ellis F. Hitt Digital Avionics Scholarship (2011)
- Raytheon Scholars Program (2010,2009)

Skills

- Strong knowledge of MATLAB/Simulink and Java
- Experience using Pro/Engineer and STK
- Trained in machine shop safety and manufacturing

Hobbies and Interests

I currently play Rugby at university, but also enjoy playing Baseball, Basketball, Volleyball or almost any other sport. I enjoy spending time with family, being in the outdoors and reading – in particular non-fiction.

Personal Statement

From a young age I have been attracted to math and science, perhaps in part from having a math teacher and an engineer as parents. I have also always been fascinated with how things work and what is 'beneath the hood', which manifested itself in my love of fixing things. In high school, when a realized that all of the math and science I had learned could be applied to describe how things worked and even to design new things, I knew that engineering was the right path for me.

I chose to pursue aerospace engineering, with a focus on astronautics, for its cutting edge technology, the elegance of its systems and the potential for research and development in this discipline to revolutionize society. My experiences over the last three years have shown me that any successful engineering project, and in particular one in aerospace engineering, requires the joint effort of a well organized, diverse team with a strong vision and plan. Given my heavy involvement in team sports and record of leadership both on and off the field, I know that I will work well in a fast-paced, team-oriented environment, and hope one day to become a leader in the aerospace industry.

Upon completion of my undergraduate degree from Princeton in 2012, I plan to continue my academic career by working towards a Master's degree in aerospace engineering. Depending on where that path takes me I may continue to work towards a PhD, or may decide to begin my professional career. Either way, I am excited about where my education has taken me so far, and am looking forward to this summer with NASA being a rewarding and eye-opening experience.

University of Alabama
Tuscaloosa, Alabama
Mechanical Engineering
Bachelors of Science, May 2012
E-mail: blellison@crimson.ua.edu

NASA Academy Research Project:

"The Hydrogen Test Facility's Composite Disk Permeability Testing"
Principal Investigator: Tina Malone

Research and Experience

- **Alabama Industrial Assessment Center** (Beginning August 2011)
- **Math Tutor,** Center of Teaching and Learning, The University of Alabama, (August 2009-December 2009)
  - Worked in coordination with the Interfraternity Council to raise the overall GPA of the IFC fraternities' fall pledge classes
- **Math Tutor,** Shelton State Bridge Program, The University of Alabama, (Fall 2009)
  - Tutored students enrolled in a study skills class at Shelton State Community College in many subjects, however, primarily in math

Memberships and Activities

- Youth Group Volunteer – Calvary Baptist Church, January 2010 – Present
- Speak-Up Tuscaloosa Volunteer, Hillcrest Middle School mentor, Fall 2009 – Present
- 2010 Panhellenic Judicial Board for Sorority Recruitment
- Student Alumni Association, Student member, Fall 2008 – Present
- FATE (Future Alumni for Tradition and Excellence), Fall 2008 - Present
- Phi Mu sorority, Fall 2008 – Present
- Phi Mu's Philanthropy Committee for Children's Miracle Network, Spring 2009 – Present
- Homecoming Dance Team (2008)
- Order of Omega Greek Honor Society
- Cardinal Key Honor Society
- Phi Eta Sigma Honor Society
- Gamma Beta Phi Honor Society
- Alpha Lambda Delta Honor Society

Honors and Awards

- Nominated for Most Outstanding Mechanical Engineering Sophomore

- ASME (American Society of Mechanical Engineers) Emerging Leader Award
- Scholastic Achievement Award, Phi Mu sorority, Fall 2008 - Present
- Dean's List, Fall 2008 – Present
- President's List, Fall 2008 - Present
- University of Alabama Scholar Award
- Engineering President Cabinet Scholarship
- Engineering Leadership Scholarship
- University of Alabama Alumni Scholar Award, 2008- 2009
- University of Alabama Alumni Heritage Scholarship

Skills

Microsoft Word, PowerPoint, Excel, AutoCAD, Mac OSx, Matlab, LabVIEW, Abaqus

Hobbies and Interests

I enjoy working out, taking ZUMBA classes, running, attending Phi Mu events, watching college football, playing cards, playing board games, fishing, being creative, and traveling.

Personal Statement

I have been interested in being an engineer ever since I began the math and science classes in grade school. Back then, I was always taking apart my toys or games and finding ways to put them back together. So, it was inevitable that I ended up studying Mechanical Engineering at the University of Alabama. I have been given so many wonderful opportunities since making the decision to attend UA. The NASA Academy at MSFC is certainly one of them. This summer internship will be my first, but I am looking forward to delving into the research, technology, and networking that comes along with it.

Connecticut College
New London, Connecticut
Astrophysics with minor in Mathematics
Bachelors of Science, May 2011
E-mail: Nicholas.gorgone@gmail.com

NASA Academy Research Project:

"Time Resolved Spectroscopy of SGR J1550-5418 In January 2009"
Principal Investigator: Chryssa Kouveliotou

Research and Experience

- **Astronomy Department,** Connecticut College, (Fall 2010)
  Independent Study advisors Professors Leslie Brown and Michael Weinstein
  - Carry out and adapt Contemporary Laboratory Experiences in Astronomy (CLEA) for undergraduates, and evaluate the difficulty of each lab
  - Create learning plans, key word lists, and lab procedure summary outlines
- **NASA Marshall Undergraduate Student Research Program (USRP),** Intern, Huntsville, AL (Summer 2010)
  - Used data taken from the Gamma-ray Burst Monitor onboard the Fermi Space Telescope to do statistical analysis on temporal parameters from Soft Gamma Repeater SGR J1550-5418
  - Worked with Chryssa Kouveliotou and Alexander van der Horst to utilize computer algorithms and technology used in gamma-ray detection and onboard The Fermi Space Telescope.
- **Astronomy Department,** Grader, Connecticut College (Spring 2010)
  - Graded weekly quizzes and checked for correct, logical, and critical thinking and analyzed them for trends and frequently missed concepts

Publications and Presentations

- Data from 2010 USRP internship presented at the 218th AAS Meeting by Alexander van der Horst, *Fermi/Gamma-ray Burst Monitor Analysis of SGR J1550-5418 Bursts During an Extreme Outburst in January 2009*
- Statistical Properties of SGR 1550-5418 Bursts, NASA MSFC, Huntsville, AL (Projected 2011)
- NASA's Marshall Space Flight Center, Summer Intern Poster Session sponsored by Lockheed Martin 3rd prize - Science category

Leadership Experience

- Physics and Astronomy Department Student Advisory Board, *Evaluation Committee,* Connecticut College (2009 – 2011)
  - Proctor the filling out of evaluations and Summarize students' comments
- "Dasein" - Ultimate Frisbee, Connecticut College, *Captain* (Fall 2008 – Spring 2009)
  - Coordinated and organized play times and schedules with captains from other teams
  - Welcomed, advised, and taught new players the sport of ultimate frisbee
- Clarinet Performance, Maine, *Principal Clarinet*
  - All-State Orchestra (2007)
  - Portland Youth Symphony Orchestra and Wind Ensemble (Spring 2006 - Spring 2007)

Community Service/Volunteerism

- Astronomy Department, Open House Observing, *Volunteer*, Connecticut College (Fall 2008-Spring 2011)
  - Taught community members about observational tools and the night sky
- Trees for Canterbury, *Volunteer*, Christchurch, New Zealand (Fall 2009)
- Arboretum Club, *Club Leader*, Brunswick High School (Fall 2005 – Spring 2007)

Professional Societies

The American Physical Society (APS), Society of Physics Students (SPS), and the American Astronomical Society (AAS)

Additional Honors and Awards

- U.S. Marines, Semper Fidelis award for musical excellence (2007)
- Northern Chi Martial Arts Center, Brunswick, ME, Black belt in Kenpo Karate (2005)

Computer Skills

- Platforms: Mac-OS, Windows, Linux
- Languages and Software: Microsoft Office Suite & Python

Hobbies and Interests

Musical ensembles and chamber music (clarinet), Ultimate Frisbee, Card games

Personal Statement

Although I started college as a pure physics and astro-oriented mind, my interest has recently shifted to include robotics, programming, and instrumentation as I feel that these are necessary elements to understand for a holistic approach to research. In the future, I plan on getting a PhD in Astrophysics and working as a mission specialist for NASA.

Columbia University
New York, New York
Astrophysics
Bachelors of Science, May 2013
E-mail: SKGrunblatt@gmail.com

NASA Academy Research Project:

"Time Resolved Spectroscopy of SGR J1550-5418 In January 2009"
Principal Investigator: Chryssa Kouveliotou

Research and Experience

- **GECo Gravitational Wave Laboratory,** *Researcher* (06/2010—9/2010)
  - Member of LSC – LIGO Scientific Collaboration (07/2010—)
- **Support Astronomer,** MDM Observatory, Kitt Peak, AZ, (05/17/10—05/29/10, 01/03/11—01/08/11, 3/10/11—3/15/11)
- **Independent Research,** "Creation of an H-R Diagram from the R-V Color of Stars in NGC 7790." Assisted by Prof. F. Chromey, Vassar College. May 2009.
- **NYPIRG**, *Outreach Officer/Canvasser*, (Summer 2009)

Memberships and Activities

- SPS- Society of Physics Students (since 1/2010)
- AAS- American Astronomical Society (since 1/2010)
- APS- American Physical Society (since 10/2010)

Honors and Awards

- National Merit Finalist, 2008-9
- National AP Scholar, 2009
- Salutatorian, Kingston High School, Class of 2009
- TAP Award for Academic Excellence, 2009
- Recipient of The Harvard Book from the Harvard-Radcliffe Club of the Hudson Valley, 2008
- Awarded one free course at Vassar College via Center for Talented Youth, Fall 2008
- Outstanding Achievement on National German Exam, 2006—2009 (4x)
- Honorable Mention at Essentially Ellington Finalist Competition, May 2009
- Performed at Carnegie Hall with National Youth Choir, March 2009

Computer Skills

- Programming: Proficient in Python, UNIX (IRAF, PyRAF)
- OS: Windows (XP, Vista, 7), Macintosh (Snow Leopard), Linux (Ubuntu 9.10, Gnome)
- Programs: Proficient with Microsoft Excel, Word, Powerpoint, Outlook, Adobe Photoshop CS4

Hobbies and Interests

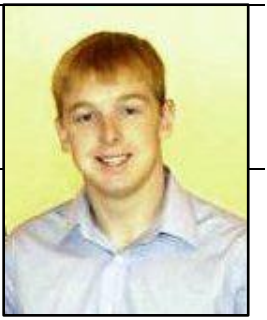
Music

- Columbia Kingsmen: 01/2010—
  - 1. Musical Director, 5/2011—
  - 2. Intercollegiate Chair, 5/2010—5/2011
- Classical Piano: 09/1997—
- Classical Euphonium: 11/2003—09/2009
  - Low Brass and Reeds Section Leader, 2008-9
- Jazz Trombone: 09/2005—
  - CU Jazz Combo, 09/2009—
  - CU Big Band, 09/2009—05/2010

Personal Statement

Sam was born and raised in Kingston, New York. Having been interested in astronomy and physics since he was a young boy, he decided to pursue it as a career at age nine while visiting an astrophysicist and family friend. From then on, he immersed himself in astrophysics literature and news. In the tenth grade, Sam enrolled in the Independent Science Research class in his high school and created an H-R Diagram of an open cluster using telescopes at Vassar College. Since entering college, Sam has enjoyed working on multiple astrophysical research projects (listed above). In his free time, Sam enjoys making and listening to music, traveling, and playing most sports (except baseball). He is the Music Director of the Columbia Kingsmen, Columbia's premier all-male a cappella group, and can probably sing any Frank Sinatra or Duke Ellington tune you can think of. He plays piano and jazz trombone as well, and is also a member of the Columbia Ski Team. In the future, Sam hopes to attend graduate school and receive his Ph.D. in astrophysics. He hopes to someday work in academia, a private research institution, or NASA—wherever he can make the largest difference in how the world views astrophysics.

Clemson University
Clemson, South Carolina
Chemical Engineering with minor in Music
Bachelors of Science, May 2013
E-mail: fwewers@clemson.edu



NASA Academy Research Project:

"Engineering Next-Generation Life Support Technologies"
Principal Investigator: Matt Mansell

Research and Experience

- **Palmetto Academy,** Clemson University, Research with Dr. Christopher Kitchens (5/10-8/10)
  - Synthesized cellulose nanocrystals (CNC) dispersed in poly-lactic acid (PLA) to develop mechanical properties of PLA
  - Developed melting and synthesis methods for PLA-CNC mixtures
  - Gained experience with various lab equipment and procedures

Memberships and Activities

- Member of Clemson University Drumline (2009 – Present)
- Captain of Winter Percussion Ensemble (2008 – Present)
- National Society of Collegiate Scholars (2009 – Present)
- National Honors Society – 2006 –2009
- American Institute of Chemical Engineers (2009 – Present)
- Marching Band and Drumline
- High School Drumline Captain for Two Years
- Duct-Tape Hammock Competition
- Tau Beta Pi Engineering Honors Society (2010-Present)

Honors and Awards

- 3.91 GPA after 1st semester Sophomore Year
- Westside High School Salutatorian (2009)
- Clemson Coca-Cola Scholar
- President's List for Academic Achievement
- Science Experiment on Synthetic Engine Lubricants and the Desired Properties- Gold Award at AOP Regional Science Fair and on to National Science Fair
- Science Experiment on Aerodynamics in Derby Cars - Gold Award at AOP Regional Science Fair and on to National Science Fair

- Gold Award at AOP Regional Science Fair for Science Experiment on Concrete and the effect of changes in amount of water have on the strength of the concrete - on to National Science Fair

Skills

- Matlab
- Autodesk Inventor
- LabVIEW
- Maple
- MS Excel, Word, Powerpoint

Hobbies and Interests

Spending time with family; playing percussion, drumset, piano and guitar; playing sports; Ultimate Frisbee, Disk Golf, Football, Bowling, Tennis, and Biking; and Whitewater rafting.

Personal Statement

I have always wanted to be an Engineer. Legos were my favorite toy, always putting new things together and taking old things apart. I once took apart a Child-Protected airplane, and ate the batteries. That is how serious and curious I was as a child to get into a child-proof toy. Even through high school and college, science and engineering just resonates within me. I enjoy taking chemistry, physics, and my chemical engineering classes and the knowledge that I gain from each. Working in a space related field has always been an interest of mine, getting a chemical engineering degree, and being able to apply what I know to new problems and new situations. The space and exploration field is one that always has new challenges to face and new obstacles to overcome. I want to apply myself to these challenges and be able to come up with a solution, through teamwork and effort.

University of Illinois at Urbana-Champaign
Champaign, Illinois
Aerospace Engineering
Bachelors of Science, May 2012
E-mail: rocketman352@gmail.com

NASA Academy Research Project:

"Small Solid Rocket Motor Oribital Launch Vehicle Design" and "Aluminum Oxide Behavior Investigation in the Combustion Process for a Solid Rocket Motor"
Principal Investigator: Mike Kovach

Research and Experience

- **Wirth Farms,** *General Laborer,* Erie, Illinois (6/00-8/10)
  - Compiled spreadsheets to streamline business cost calculations and record data
  - Maintained facilities and equipment; including rebuilding a snowmobile engine and restoring a motorcycle
  - Planted and harvested approximately 1600 acres of corn and soybeans
- **Wyffels Hybrids,** *Production Assistant,* Atkinson, Illinois (1/06-7/10)
  - Prepared and assembled customers' orders on a daily basis
  - Served as field inspector during detasseling season; reported findings directly to field foreman
  - Managed inventory transactions and entered customer data using proprietary software
- **John Deere,** *Production Control Assistant,* Moline, Illinois (2/08-9/08)
  - Identified obsolete inventory that was wasting available floor space in factory
  - Collected inventory audits to reflect actual quantities using company proprietary software
  - Assisted in scheduling the daily production plan as needed
- **J&B Enterprises,** *Field Worker,* Sterling, Illinois (7/01-7/05)
  - Supervised a crew of four people to ensure efficiency; reported issues with crew to supervisor
  - Detasseled seed corn

Memberships and Activities

- Illinois Space Society, *Technical Project Committee Member/Educational Outreach Member* (8/09-Present)
  - Built a solid fuel rocket that flew to 8,760 feet and flew at supersonic speeds

- Help plan events to educate young students about rocketry and science
- Collaborated with other committee members to discuss ideas and operate together to build rockets

- American Institute of Aeronautics and Astronautics, *Member,* (8/09-Present)

Honors and Awards

- Member of Phi Sigma Theta National Honor Society

Skills

Java programming language, MATLAB, Mathematica, AutoCAD, Microsoft Office

Hobbies and Interests

A few things I enjoy are mountain biking, road biking, skiing, swimming, working out, golf, tennis, snowmobiling, riding motorcycles, reading, travelling, watching movies, and listening to music. These are not the only things that I enjoy doing; I am open to many more sports and activities and I also like to try new things.

Personal Statement

Living on a farm my entire life has led me to develop a very strong work ethic which has allowed me to be successful in my endeavors. I have enjoyed life on the farm but it does not interest me enough to spend the rest of my life farming. I developed my interest in space when I was a child after watching Star Wars, Apollo 13, and October Sky. When I was very young, I loved to create inventions with objects around the house; I built several rockets out of materials ranging from paper towel tubes to old prescription medicine bottles. My projects eventually became more and more sophisticated throughout the years; I eventually moved up to working on things like rebuilding a snowmobile engine and restoring a vintage motorcycle. I had to learn several new things to finish these projects and they were very rewarding experiences. With my interest in space accompanied by my passion for math and science, it wasn't too hard to think of some possible careers that might interest me. Ever since seventh grade when we had to do a project on our future careers, I knew that I wanted to become an engineer. Last year I built my first high power rocket with a small group of classmates that reached supersonic velocity and I am currently in the process of building my own high power rocket. In addition, I am currently involved with the Educational Outreach program of the Illinois Space Society at the University of Illinois. This semester, three other classmates and I gave a presentation to local boy scouts so that they could earn their space exploration badges. We are also currently planning ahead to give future presentations to middle school students regarding robotics and rocketry next fall. Someday I hope to work in the space industry researching improved propulsion systems for use in space exploration.

Santa Clara University
Santa Clara, California
Mechanical Engineering
Bachelors of Science, June 2011
E-mail: zempel.c@gmail.com

NASA Academy Research Project:

Principal Investigator: Marty Kress
"Potential Future Spacecraft Projects"

Research and Experience

- **Student Research Assistant,** Santa Clara University Office of Institutional Research (6/10-Present)
  - Inventoried Santa Clara University documentation and conducted relevant statistical research
  - Trained additional student and composed extensive instructional procedures for future student employees
  - Worked independently with few instructions and training to trouble shoot and problem solve
- **Project Manager,** Student Hands-on Training II (Summer 2010)
  - Led a team of four students who built a balloon-satellite launched out of Boulder, Colorado
  - Designed and built small satellite from the ground up with beacon payload and launched by weather balloon
  - Gained comprehensive "hands-on" introduction to satellite subsystems
- **Design Engineer,** Senior Design for Santa Clara University (9/010-6/11)
  - Developed an experimental test bed to test radical concepts for an ergonomic office chair
  - Led conceptual and physical design, and construction for final prototype
  - Worked in a four person interdisciplinary team to produce a prototype
  - Applied technical skills in a new field during rapid conceptual design development stage
- **Satellite Research and Develop (IRIS),** Santa Clara University Nanosats Program (1/09-6/10)
  - Used SolidWorks and CosmosWorks, performed basic finite element analysis of first stages of IRIS structure
  - Maintained efficient and effective communication between different subsystems on a complex and multidisciplinary project
  - Performed computer and experimental analysis of hysteresis rods for passive attitude determination and control

- Developed basic understanding of orbital mechanics for active attitude determination and control
- **Lab Assistant,** NASA Ames Education Associates (Summer 2008)
  - Collaborated with other assistants to determine pond sample composition
  - Demonstrated quick familiarization various types of mass spectrometers
  - Applied myself in unfamiliar field that required very steep learning curve
  - Prepared presentation materials for science conferences and meetings

Memberships and Activities

- Mechanical Engineering Honor Society Pi Tau Sigma (2009)
- Engineering Honor Society Tau Beta Pi (2009) and tutor
- Jesuit Honors Society Alpha Sigma Nu (2011)
- Order of the Engineer (2011)

Honors and Awards

- Graduated Magna Cum Laude (2011)
- Santa Clara University Dean's List - Engineering (2008-2009, 2009-2010)
- Aerospace Innovation Design Challenge grand prize winner, $2,000 (2009)
- Santa Clara University Jesuit Ignatian Scholarship (2007)

Skills

- Computer: MS Office, MATLAB, SolidWorks (including proficiency in FEA with CosmosWorks), LaTeX
- Laboratory: Machine Shop
- Academic: Graphical Communication in Design, Marine Operations, Satellite Operations Lab, Aerospace Structures, Mechanism Design, Orbital Mechanics, Quantum Physics
- Personal: Quick learner, self-motivated, strong communication skills

Hobbies and Interests

Jazz, sailing, good food, and reading

Personal Statement

I recently graduated Magna Cum Laude from Santa Clara University with a BS in Mechanical Engineering. In the fall, I will be continuing on to Masters in Robotics and Mechatronic Systems. In my four years, I have been awarded memberships into Tau Beta Pi, Pi Tau Sigma, and Alpha Sigma Nu for academic scholarship. I have dedicated a majority of my time to engineering, such as my participation in SHOT I and II with the University Nanosatellite Program. I then explored the world of entrepreneurship for my senior capstone project in which I helped design a radical ergonomic chair by conducting market research, conceptual design, and ultimately building and testing of a prototype. At NASA's MSFC, with Dr. Martin Kress, I plan to make the most of as many opportunities as possible. And finally, I hope that my work with the NASA Academy will mark the beginning of my contributions to NASA.

Program Director

Dr. Frank Six

Frank Six is the University Affairs Officer at MSFC. He joined Marshall in 1986 as Deputy Project Scientist for Hubble, then became assistant to the Director of the Space Science Laboratory and then deputy to the Chief Scientist. He directed the Marshall Academies in 1994, 1995 and 1996, and led all university programs from 1989 to 1996. Before coming to MSFC, Frank worked for Cornell University as assistant to the director of the Arecibo Observatory. Prior to that, he taught physics and astronomy at Western Kentucky University where he was Chairman of the Department for 17 years. Upon receiving the PhD in physics from the University of Florida, Frank joined Brown Engineering in Huntsville, Alabama working on the Apollo project. His research areas are radio astronomy and planetary magnetospheres. He is married with six children and eight grandchildren and loves to explore the coastal regions of the Gulf of Mexico.

Program Manager

Dr. Gerald R. Karr

Karr is a Professor of Mechanical and Aerospace Engineering at the University of Alabama in Huntsville. Since 1992, Dr. Karr has also served as the UAH Campus Director of the Alabama Space Grant Consortium (ASGC). Karr also served as the Chair of the Mechanical and Aerospace Engineering Department at UAH from 1986 through 1999. Since 1978, Karr has been the University Director of the highly successful NASA Summer Faculty Research Opportunity program. He has also been an active researcher in the areas of satellite drag, high-energy lasers, cryogenics, spacecraft thermal design and computational fluid mechanics. Karr earned his BS (1964), MS (1966), and PhD (1969) in Aeronautical and Astronautical Engineering at the University of Illinois at Champaign-Urbana. For recreation, Karr enjoys golf, running, sailing and visiting with his children and grandsons.

Operations Manager

Daniel Polston
daniel.polston@gmail.com

Daniel is an alumnus of the 2010 NASA Academy at MSFC. He will graduate in December 2011 from the University of Kentucky with a Bachelor of Science in Mechanical Engineering and a Minor in Mathematics. Daniel has worked in the Environmental Control and Life Support Systems Branch at MSFC during the 2010 NASA Academy and 2009 NASA USRP. His research includes regenerative activated carbon catalysts through carbon gasification and carbon dioxide reduction through the Bosch process – areas of research for oxygen-recovery technology necessary for future long-term manned exploration missions. After completing his Bachelor of Science, he plans to conduct his graduate studies at the University of Kentucky in Mechanical Engineering with a concentration in Systems and Design. Daniel enjoys camping, disc golfing, card games, ultimate Frisbee, listening to music, exploring, and spending time with his friends and family. Through connecting what he has always enjoyed doing – designing, thinking, and creating – with a lifelong career, Daniel seeks to entertain his dream of being among the innovative leaders in our technology-driven world.

- ***NASA Academy:***
  http://www.nasa-academy.nasa.gov/
- ***NASA Academy Alumni Association:***
  http://www.nasa-academy.org/
- ***NASA Agency:***
  http://www.nasa.gov
- ***NASA Marshall Space Flight Center:***
  http://www.msfc.nasa.gov/
- ***International Space University:***
  http://www.isunet.edu
- ***The Soffen Memorial Fund:***
  http://www.nasa-academy.org/soffen/donors.html